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## PATENT SPECIFICATION

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(19)



## (54) IMPROVEMENTS IN OR RELATING TO RESCUE APPARATUS

(71) I, WESLEY STUART GREEN, a British Subject of 11, Thomas Road, Fulbourn, Cambridge, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to rescue apparatus, and more particularly to an apparatus for rescuing immobile persons, such as hospital patients, from hazardous conditions, such as a hospital when on fire.

A large number of patients in hospitals are unable to walk or move themselves with any great speed, and in the case of a fire breaking out in a hospital it is necessary for the nursing staff to move the patients who are not able to move themselves to a place of safety. In some hospitals a large proportion of the patients may be immobile, e.g. in geriatric hospitals, and in such hospitals nursing staff may have to move a large number of patients within a short period of time.

At present in many hospitals ropes are provided which are stored in suitable boxes or on hooks located outside the wards. In the case of a fire all available staff obtain ropes from the boxes, and two ropes are passed under the mattress under each immobile patient, the ends of the ropes then being looped together and the ropes being tightened and tied off so that the mattress is curved partially to surround the patient. The patient may then be moved by dragging on one of the ropes, the mattress acting to minimize any bumps that may be imparted to the patient if, for example, it is necessary to drag the patient up or down a flight of stairs.

The disadvantages of this system are that two nurses are required to pass the ropes under the mattress, as one nurse must lift the mattress whilst the other passes the rope under the mattress. Furthermore the nurses need training to enable them to tie the correct knots in the rope. A further disadvantage is that if a patient is frightened, or if the patient is suffering from

a disturbed mental condition, the patient may firmly grasp the sides of the bed adjacent the mattress, thus making it impossible for the nurses to lift the mattress to pass the rope underneath. Yet another disadvantage is that it takes a considerable amount of time even for well trained nurses to rescue a patient utilising ropes.

It has been proposed to use straps with tensionable buckles instead of ropes. It is not possible to leave such straps permanently on a bed, extending underneath the mattress since some patients may remove the straps. This may be serious in hospitals such as mental hospitals, where the patients may use the straps to hang themselves, or in attempts to strangle other patients. Thus such straps are preferably stored in suitable boxes located outside the ward, and in the case of a fire the straps are brought from the box to the patient to be moved, and straps are passed under the mattress prior to being buckled. Thus the use of the straps suffers from some of the disadvantages exhibited by the ropes. A further disadvantage with the straps is that the straps may get twisted, and thus the strap may be incorrectly threaded through the buckle, rendering the strap liable to become released.

In utilising the straps two straps are placed under the mattress of a patient to be moved and the straps are tightened so that the mattress is curved and partially surrounds the patient. The patient may then be moved along by grasping one of the straps and dragging the patient along.

If a patient is dragged down stairs first when a mattress has been curved around the patient by means of ropes or straps the treads of the stairs may engage with the rope or strap located at the head of the mattress and the rope or strap may slide upwards towards the patient's chin, and severe injury or even death may result.

It is an object of this invention to provide a rescue apparatus that may be safely used to rescue immobile persons such as patients in a hospital.

According to this invention, there is

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provided a rescue apparatus suitable for rescuing immobile persons, said apparatus comprising a generally rectangular sheet of flexible material, a handle at one narrower

5 end of said sheet said handle being secured directly to the sheet, and two or more single straps extending widthwise across the sheet, each strap extending at each end thereof beyond the edge of the sheet, each strap being provided with a buckle to enable the two ends thereof to be secured together, and each strap being securely attached to said sheet throughout the region in which the strap extends across the sheet.

10 Conveniently three single straps may be provided.

Advantageously the sheet may have dimensions corresponding to the dimensions of a standard single mattress.

15 20 Both narrower ends of the sheet may be provided with a handle to enable the rescue apparatus to be grasped readily from either end. The handle or handles and the straps may be secured to the sheet by stitching.

25 Conveniently the buckle provided on each strap may be a quick-release buckle having one component secured to each end of the strap, the two components being adapted to engage with each other. One component of the buckle may be provided with a device adapted to grasp the strap releasably to enable the strap to be tensioned after the buckle components have been engaged.

30 35 Conveniently the sheet and the straps and the handles may be made of a nylon material, although in certain cases the sheet and the straps and the handles may be made of stretcher canvas. Of course other suitable materials may be used. If nylon is utilized the material may be treated with an anti-static agent.

40 45 In order that the invention may be more readily understood and so that further features thereof may be appreciated the invention will now be described by way of example with reference to the accompanying drawing which is a schematic plan view of one embodiment of the invention with the straps laid out to their fullest extent.

50 55 A rescue apparatus in accordance with this invention comprises a generally rectangular sheet 1 of nylon material that is dimensioned to lie under a standard single sized mattress. The sheet may be about 70" long and about 34" wide. Extending widthwise across the sheet are two straps 3, 4 and that are about 2" wide and formed of a strong nylon webbing, the straps being parallel. Each strap is located about 17" from the respective end of the sheet. Each strap extends further from one edge of the sheet than the other, one portion of each

60 other portion 7, 8, extending about 65". Each end of each strap is provided with a components 9, 10, 11, 12 of a quick-release buckle, the two components provided on each strap being adapted to engage with one another in one predetermined way to enable the ends of each strap to be secured together, the components 9, 10, 11, 12 being adapted to be connected and disconnected rapidly. One component of each buckle is provided with a tensioning device adapted to grasp the strap releasably so that if portions of the straps 7, 8 are pulled after the buckle components have been connected the straps may be tensioned.

65 Such quick release buckles are described in British Patent Specification 690,104. It will be understood that the quick release buckles are shown schematically in the drawing. The two straps are securely connected to the sheet throughout the region where the straps extend across the sheet by stitching, so that the rescue apparatus comprises an integral unit.

70 75 At each narrow end of the sheet a handle 13, 14 is provided. Each handle is formed from a 2" wide strap of nylon material that is approximately 26" long. A central region of the handle which is about 18" in length is machined so that the handle is of reduced width in this region to enable the handle to be grasped readily. The handles 13, 14 are secured to the sheet by portions 15, 16, 17, 18 thereof, which are stitched to the sheet.

75 80 The portions of the handles which are stitched to the sheet extend outwardly at an angle to the longitudinal axis of the sheet.

85 90 In utilizing the rescue apparatus as hereinbefore described, the sheet 1 is placed on a bed immediately under the mattress, and may replace a hessian sheet which is commonly placed between the springs of a bed and mattress. The two ends of each strap 3, 4 may be drawn towards each other under the bed and the components 9, 10, 11, 12 of the buckles may be engaged, the straps 3, 4 subsequently being tightened to

95 100 hang above the floor and out of the way. With the rescue apparatus in this position the apparatus does not interfere with the use of the bed, and it is difficult for a patient to use the device for hanging himself or in an attempt to strangle another patient.

105 110 In the case of a fire a nurse may release the buckles under the bed, and may subsequently pass the long portions 7, 8 of the straps over the bed, re-engage the components 9, 10, 11, 12 of the buckles and then tension the straps 3, 4 to partially draw the mattress around the patient. The nurse

115 120 125 may then grasp a handle 13 or 14 at either end of the sheet 1 and may drag the patient to a place of safety. If it is necessary to negotiate stairs, either going upstairs or downstairs, the patient will be protected

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| 5  | from any bumps by the mattress. The nylon material used for the sheet may have a shiny surface which presents little friction, thus enabling the patient to be moved rapidly. The patient may be slid down a chute or other similar escape device whilst in the escape apparatus.  | 60  |
| 10 | It has been found that a nurse working alone can utilise a rescue apparatus as herein described to remove a person from a hospital ward in a very short period of time. It can be seen that if the apparatus is fitted to every bed in a hospital it is not necessary for nurses to look for rescue apparatus in the case of a fire, nor is it necessary for the nurse to lift a mattress to pass ropes or straps under the mattress. Similarly, since the buckle comprises two components that are adapted to engage with one another in one predetermined way the buckle is easily utilised correctly to secure the ends of the straps, and the tensioning arrangement may easily be used to tension the straps. | 65  |
| 15 | In some hospitals it is the practice to take a patient to the anaesthetising area or operating theatre on his or her bed, and in such cases the use of nylon may not be advisable due to the possibility of a spark being generated by static electricity formed on the sheet, since some anaesthetics are explosive. Thus it may be advisable to use a sheet and straps formed from a material such as stretcher canvas or rubber, or it may be desirable to treat the nylon material with 20 an anti-static agent.   | 70  |
| 20 | It is to be understood that the above particularly described sheet comprises only one embodiment of the invention. If desired three straps may be provided extending across the sheet, and the handles provided at the ends of the sheet may be longer than those described above. However, it should be noted that the short handles described above make it necessary for a rescuer to bend down when dragging a patient along, thus bringing the head of the rescuer close to the floor. This may prove advantageous during a fire since smoke and hot fumes may accumulate in portions of a room, or ward adjacent the ceiling, whereas there 25 may be fresh air adjacent the floor.                          | 75  |
| 25 | It is to be understood that whilst the foregoing description relates primarily to the rescue of patients from a fire, a rescue apparatus in accordance with the invention may be utilised to rescue any bedridden, non-ambulatory, unconscious, ill or mentally disturbed person or persons from a 30 place of danger or potential danger, e.g. a  | 80  |
| 30 | room subjected to smoke, heat, noxious 35 gases, or other hazardous environment. It is also to be understood that whilst the invention may be of particular value in a hospital, rescue apparatus in accordance with the invention may also be utilised, for example, in a Home for the Elderly or in an hotel.  | 85  |
| 35 | <b>WHAT I CLAIM IS:—</b>   | 90  |
| 40 | 1. A rescue apparatus suitable for rescuing immobile persons, said apparatus comprising a generally rectangular sheet of flexible material, a handle at one narrower end of said sheet, said handle being secured directly to the sheet and two or more single straps extending widthwise across the sheet, each strap extending at each end thereof beyond the edge of the sheet, each strap being provided with a buckle to enable the two ends thereof to be secured together, and each strap being securely attached to said sheet throughout the region in which the strap extends across the sheet.  | 95  |
| 45 | 2. A rescue apparatus according to claim 1 wherein three single straps are provided.   | 100 |
| 50 | 3. A rescue apparatus according to claim 1 or claim 2 wherein both narrower ends of the generally rectangular sheet are provided with a handle to enable the apparatus to be grasped readily from either end.  | 105 |
| 55 | 4. A rescue apparatus according to any one of the preceding claims wherein the buckle provided on each strap is a quick-release buckle having one component secured to each end of the strap, the two components being adapted to engage with each other.  | 110 |
| 60 | 5. A rescue apparatus according to claim 4 wherein one component of each buckle is provided with a device adapted to grasp the strap releasably to enable the strap to be tensioned after the buckle components have been engaged.   | 115 |
| 65 | 6. A rescue apparatus according to any one of the preceding claims wherein the apparatus is formed of a nylon material.  |     |
| 70 | 7. A rescue apparatus according to claim 6 wherein said nylon material is treated with an anti-static agent.   |     |
| 75 | 8. A rescue apparatus according to any one of claims 1 to 5 wherein the apparatus is formed from stretcher canvas.   |     |
| 80 | 9. A rescue apparatus according to any one of the preceding claims wherein the sheet has dimensions corresponding to the dimensions of a standard single mattress.   |     |
| 85 | 10. A rescue apparatus substantially as herein described with reference to and as illustrated in the accompanying drawing.   |     |

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1434832      COMPLETE SPECIFICATION  
1 SHEET  
*This drawing is a reproduction of  
the Original on a reduced scale*

